

SUBJECT TEACHING GUIDE

G999 - Digital Electronics

Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2023-2024

| 1. IDENTIFYING DATA | | | | | |
|----------------------------------|---------------------------------------------------------------------------|------------------|--------------------|------------------|--------------------|
| Degree | Degree in Industrial Electronic Engineering and Automatic Control Systems | | | Type and Year | Compulsory. Year 2 |
| Faculty | School of Industrial Engineering and Telecommunications | | | | |
| Discipline | Subject Area: Industrial Electronics Module: Specific Technology | | | | |
| Course unit title and code | G999 - Digital Electronics | | | | |
| Number of ECTS credits allocated | 6 | Term | Semester based (2) | | |
| Web | | | | | |
| Language of instruction | Spanish | English Friendly | Yes | Mode of delivery | Face-to-face |

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|------------------|--------------------------------------------------------------------------------------------------------|--|--|--|--|
| Department | DPTO. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA | | | | |
| Name of lecturer | CHRISTIAN BRAÑAS REYES | | | | |
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| Office | E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO ASOCIADOS GIC 1 (S3022) | | | | |
| Other lecturers | JUAN ECHEVARRIA CUENCA ALEJANDRO NAVARRO CRESPIN | | | | |

3.1 LEARNING OUTCOMES

- Ability to analyze and design digital circuits, both combinational and sequential.

- Ability to design, perform experiments, analyze and understand results.

4. OBJECTIVES

Ability to apply the main concepts of Digital Electronics to solve practical problems and work autonomously.

Capacity for the Analysis and Synthesis of Combinational and Sequential Circuits.

Manage the necessary instrumentation in a Digital Electronics laboratory and interpret the obtained results

To know the existing CAD tools for the resolution of more complex problems using FPGAs.

Know the basic blocks and the operation of the microcontrollers.

6. COURSE ORGANIZATION

CONTENTS

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|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Basic concepts: - Boole's Algebra - Numerical systems - Implementation of CMOS logic gates - Programmable devices |
| 2 | Combinational Design: - Logical minimization - Synthesis of combinational circuits - Combination design based on HDLs - Arithmetic circuits |
| 3 | Sequential design: - Latches and flip-flops - Design of sequential circuits - Registers and counters - Optimization of finite state machines - Sequential design based on HDLs |
| 4 | Blocks of digital systems: - RTL description - Memories - Control unit and "data path" |

7. ASSESSMENT METHODS AND CRITERIA

| Description | Type | Final Eval. | Reassessn | % |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------|-----------|--------|
| Final Exam | Written exam | Yes | Yes | 40,00 |
| Continuous evaluation | Others | No | No | 30,00 |
| Laboratory practices | Laboratory evaluation | Yes | Yes | 30,00 |
| TOTAL | | | | 100,00 |
| Observations | | | | |
| Given the uncertain situation that the social distancing measures established by the health authorities do not allow the development of some teaching activity in the classroom for all enrolled students, a mixed teaching modality will be adopted that combines this classroom teaching with distance teaching. In the same way, tutorials may be replaced by remote tutoring using telematic means. | | | | |
| Observations for part-time students | | | | |
| The evaluation criteria for part-time students are the same as for full-time students. | | | | |

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

R. H. Katz. Contemporary Logic Design. 2º Edi. Ed. Pearson Education.2005.